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July 28, 2000

**BOX PATENT APPLICATION**  
Assistant Commissioner for Patents  
Washington, D.C. 20231

Re: Application of Norbert VENET, Claude DREVON, and Stephane ALBINET

**MODULE INCLUDING AN INDUCTIVE WINDING AND METHOD OF  
OBTAINING IT**  
Our Ref. Q60260

Dear Sir:

Attached hereto is the application identified above including 9 sheets of the specification, claims and abstract, 1 sheet of formal drawings, executed Assignment and PTO 1595 form, and executed Declaration and Power of Attorney. Also enclosed is the Information Disclosure Statement.

The Government filing fee is calculated as follows:

Total claims	<u>7</u>	-	<u>20</u>	=	<u>0</u>	x	\$18.00	=	<u>\$0.00</u>
Independent claims	<u>3</u>	-	<u>3</u>	=	<u>0</u>	x	\$78.00	=	<u>\$0.00</u>
Base Fee									<u>\$690.00</u>

<b>TOTAL FILING FEE</b>	<u><b>\$690.00</b></u>
Recordation of Assignment	<u><b>\$40.00</b></u>
<b>TOTAL FEE</b>	<u><b>\$730.00</b></u>

Checks for the statutory filing fee of \$690.00 and Assignment recordation fee of \$40.00 are attached. You are also directed and authorized to charge or credit any difference or overpayment to Deposit Account No. 19-4880. The Commissioner is hereby authorized to charge any fees under 37 C.F.R. §§ 1.16 and 1.17 and any petitions for extension of time under 37 C.F.R. § 1.136 which may be required during the entire pendency of the application to Deposit Account No. 19-4880. A duplicate copy of this transmittal letter is attached.

Priority is claimed from July 29, 1999 based on French Application No. 9909860. The priority document is enclosed herewith.

Respectfully submitted,  
**SUGHRUE, MION, ZINN,**  
**MACPEAK & SEAS, PLLC**  
Attorneys for Applicant

By: David J. Cushing  
David J. Cushing  
Registration No. 28,703

MODULE INCLUDING AN INDUCTIVE WINDING AND METHOD  
OF OBTAINING IT

BACKGROUND OF THE INVENTION

Field of the invention

5        The invention relates to a method of obtaining a one-piece module including an inductive winding. It also relates to one-piece electronic modules, and in particular to modules with a winding around a magnetic core, obtained by means of the method, for example converter modules.

Description of the prior art

10      Producing windings consisting of superposed turns consisting of conductive tracks carried by a printed circuit folded on itself to align the turns along an axis corresponding to the axis of the winding to be obtained is known in the art.

The document US-A-5801611 describes an inductive device obtained in this way using a printed circuit on which winding turns are made on both faces at locations of the circuit which are stacked in parallel planes by multiple folding of the circuit on itself. It is necessary to provide connections passing through the printed circuit to connect the interior end of the spiral assembly made up of turns at a location on the printed circuit to a corresponding end of the spiral assembly according to the winding to be obtained. These connections are conventionally provided in the form of metal-plated holes which pass through the printed circuit to connect each of the two spiral assemblies. Solutions of this kind are relatively costly and relatively difficult to implement and their reliability is not always satisfactory.

SUMMARY OF THE INVENTION

25      The invention therefore proposes a method of obtaining a module including at least one inductive winding made up of one or more conductive tracks on a printed circuit film support on which the tracks form turns which are combined to form a winding or a plurality of parallel and/or coaxial windings, which method includes the following steps:

- stacking a plurality of aligned modular printed circuit film elements carrying a set of turns which are intended to form part of a winding or of a plurality of parallel and/or coaxial windings and whose tracks terminate at or near the edge or one edge of the element that includes them,
- molding an insulative material over the stacked assembly of modular elements to constitute a rigid block,
- cutting the molded block laterally along the stack to expose the conductive

tracks at a common alignment level and so that they are flush with the surface of one face of the block, which cutting step is performed at least once, and

- creating connections on the face or faces of the block with which the modular conductive track elements are flush to interconnect them selectively and to connect them to connection means external to the module.

According to the invention, at least one end of a stack of modular elements is associated with one or more supplementary modular printed circuit elements which carry components and which have conductive tracks which terminate at a level corresponding to an alignment level of modular elements of the stack in order to perform the molding, cutting and connection creation steps simultaneously on all the associated modular elements.

In the context of the method according to the invention, an association of this kind enables a complete functional electronic module to be constructed by stacking modular elements and interconnecting all the modular elements by a connection operation common to all the elements.

According to the invention, at least one orifice is formed in the same position in the modular elements adapted to constitute a module to form therein a conduit enabling a core to be inserted through the modular elements.

This enables converter blocks including windings aligned along magnetic cores to be made in a minimum number of operations.

The invention also provides an electronic module in the form of a block which includes at least one inductive winding consisting of one or more conductive tracks on a printed circuit film support on which the tracks form turns which are combined to form the coil or parallel and/or coaxial coils, which module includes a stack of modular printed circuit film elements aligned at one edge at least and each carrying one or more turns which are to form part of a winding or of a plurality of parallel and/or coaxial windings and whose tracks terminate on a particular face at aligned edges of stacked modular elements at which conductive tracks are formed to connect turns to each other.

The resulting module has the advantage that it constitutes a rigid block, for example a cubical or rectangular parallelepipedal block, incorporating a connection network on at least one face.

In one variant of the invention the module is an electronic module incorporating a core and taking the form of a block which includes at least one winding made up of conductive tracks on a printed circuit film support adapted to

form turns, in a particular arrangement, and wherein at least some turns are combined to form a winding, which module includes a stack of modular printed circuit film elements aligned at one edge at least and each carrying one or more turns which are to form part of a winding or a plurality of parallel and/or coaxial windings and whose tracks terminate at a face defined by aligned edges of stacked modular elements on which are formed conductive connecting tracks for connecting the turns to each other and to connection elements of external connection means, and at least some of the adjacent modules in the stack include identical openings at the center of at least one turn relating to a particular winding to form a passage for a core housed in a conduit formed by successive modules incorporating such openings.

In one variant of the invention, the module is a converter module, for example, and at least one supplementary modular printed circuit element carrying components is embedded in the molded block at one end at least of the stack of elements forming a winding or windings and each supplementary element includes conductive tracks terminating at and electrically connected to conductive tracks formed on a particular face of the block by aligned edges of stacked modular elements.

The invention, its features and its advantages are explained in the following description, which is given with reference to the accompany drawing.

#### 20 BRIEF DESCRIPTION OF THE DRAWING

The single figure of the accompanying drawing shows an electronic module according to the invention in section. The module includes an inductive winding constructed from conductive tracks forming turns around a magnetic core.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

25 The method according to the invention is for obtaining modules including one or more windings each made up of a plurality of turns in which the conductive member is a conductive track carried by a thin printed circuit, for example a printed circuit formed on a film.

30 The electronic module 1 shown by way of example in figure 1 includes an inductive winding around a magnetic core comprising two parts 2A, 2B abutted end-to-end. An arrangement of this kind is intended to constitute a converter, for example.

35 The module includes one or more windings around the middle tubular part of the core constituted by the two parts 2A and 2B abutted end-to-end. The windings preferably have parallel and/or coaxial axes according to whether they have parallel

longitudinal axes or a common axis, in which case they can be concentric or aligned with each other, as required. In the remainder of the description, for simplicity, only one winding is referred to and is assumed to be aligned with the longitudinal axis YY' of the module.

5        The turns of the winding of the module consist of conductive tracks carried by a printed circuit film, in a manner known in the art, and define stacked repetitive spiral patterns. The stacking is along the longitudinal axis YY' in the module shown. According to the invention, the repetitive patterns are formed on separate modular printed circuit film elements which are intended to be stacked, as shown in the figure  
10 for the film elements 3A. In this example, the film elements, such as the elements 3A and 3N, are rectangular in shape and incorporate an opening through which the middle tubular part of the core consisting of the two parts 2A, 2B abutted end-to-end pass. The turns carried by the film elements are formed identically around the central opening of the element that carries them. The conductive tracks which constitute them  
15 extend as far as the periphery of the film element that carries them. In a preferred embodiment of the invention the film elements carrying turns which are intended to form part of the same stack preferably have the same dimensions and the conductive tracks forming their turns are reproduced identically on all the film elements.

The film elements which are intended to be stacked are aligned in a jig, for  
20 example by means of fixed rods included in the jig over which the film elements are placed, the film elements being provided with appropriate perforations at predetermined locations. The conductive tracks corresponding to the turns can extend to an alignment edge, for example, or can stop at the same distance from that edge. It is equally feasible to align different conductive tracks at different edges, in  
25 particular at opposite edges of the elements, if necessary.

In a preferred embodiment of the method according to the invention of obtaining modules, the modular elements, such as the elements 3A, 3N, which are intended to be stacked to constitute a winding are stacked in a jig in which they are superposed exactly one on the other because of their identical dimensions and  
30 because they are guided into position by the jig. The corresponding conductive track ends are then aligned, as symbolized by the straight line segment 5C and 5D in the figure. The aligned ends form rows parallel to the stacking axis, which in practice corresponds to the longitudinal axis YY' of the module obtained.

The resulting stack is then embedded in an insulative material, usually a  
35 polymer resin, which is hardened to form a block which in this example has regular

dimensions. The block is a rectangular parallelepiped, for example. In the case of a module including a magnetic core, the molding process leaves a passage 6 for the core through the modular film elements of the stack.

- Supplementary modular printed circuit elements, such as the elements 7A, 7B, 7C, can be associated with at least one end of the stack in order to complete, from the functional point of view, the module which includes the winding obtained by stacking and to include the whole in the same molded block of insulative material. The supplementary printed circuit modular elements can be single-sided, double-sided or multilayer elements. They are used to mount components, for example surface-mount components (SMC). The components can be positioned either on the outside of the block, such as the components 8A, 8B, or inside the block, such as the components 8C, 8D. Like the stacked modular elements 3A, 3N, the supplementary modular elements have conductive tracks which extend to an alignment edge of the element or end at the same distance from that edge.
- The molding operation then takes place with the assembled modular elements, such as the elements 3A, 3N, 7A, 7B, 7C, disposed in the jig so that the modules are perpendicular to an axis corresponding to the longitudinal axis YY' of the module, along which the modules are pre-positioned, for example using a system of removable shims.
- After molding, the resulting block is cut in a direction parallel to the longitudinal axis of the module so that the conductive tracks of the modular elements are flush with at least one lateral face of the molded block of the resulting module, such as the face 9.
- Connections are then formed on the face or faces of the block with which the conductive tracks of the modular elements are flush in order to connect the latter to interconnection tracks and/or to connection members of connection means external to the module. In a preferred embodiment of the invention this operation is performed by metallizing at least the face or faces of the block concerned. Selective interconnection conductive tracks between modular elements, such as the elements 5C and 5D, and connection elements for connection means external to the module are thus formed on the metallized face or faces. For example, this is obtained by localized metallization or by metallization followed by selective elimination of the metal deposit sparingly the tracks and the areas provided for the connection elements where the conductive tracks of the modular printed circuit elements are flush with the face or faces of the block concerned. The connection

elements are of the type conventionally provided for external connection means using balls or conductive tracks, for example of the lead frame type.

The conductive tracks on the faces of the block can be protected by depositing one or more layers of insulative material if required, as is standard

5 practice in the art.

In one particular embodiment, if the core housing 6 provided in the block opens to the exterior of the block, the module is completed by inserting the core. In the example shown, the two parts 2A, 2B of the core are therefore inserted from opposite sides of the module where their respective tubular parts join and are fixed

10 together, for example glued together.

THERE IS CLAIMED:

1. A method of obtaining a module including at least one inductive winding made up of one or more conductive tracks on a printed circuit film support on which said tracks form turns which are combined to form a winding or a plurality of parallel and/or coaxial windings, which method includes the following steps:

  - stacking a plurality of aligned modular printed circuit film elements carrying a set of turns which are intended to form part of a winding or of a plurality of parallel and/or coaxial windings and whose tracks terminate at or near the edge or one edge of the element that includes them,
  - molding an insulative material over the stacked assembly of modular elements to constitute a rigid block,
  - cutting the molded block laterally along the stack to expose the conductive tracks at a common alignment level and so that they are flush with the surface of one face of the block, which cutting step is performed at least once, and
  - creating connections on the face or faces of the block with which the modular conductive track elements are flush to interconnect them selectively and to connect them to connection means external to the module.
2. The method claimed in claim 1 wherein at least one end of a stack of modular elements is associated with one or more supplementary modular printed circuit elements which carry components and which have conductive tracks which terminate at a level corresponding to an alignment level of modular elements of said stack in order to perform the molding, cutting and connection creation steps simultaneously on all the associated modular elements.
3. The method claimed in claim 1 wherein at least one orifice is formed in the same position in the modular elements adapted to constitute a module to form therein a conduit enabling a core to be inserted through said modular elements.
4. An electronic module in the form of a block which includes at least one inductive winding consisting of one or more conductive tracks on a printed circuit film support on which said tracks form turns which are combined to form said coil or parallel and/or coaxial coils, which module includes a stack of modular printed circuit film elements aligned at one edge at least and each carrying one or more turns which are to form part of a winding or of a plurality of parallel and/or coaxial windings and whose tracks terminate on a particular face at aligned edges of stacked modular elements at which conductive tracks are formed to connect turns to each other.

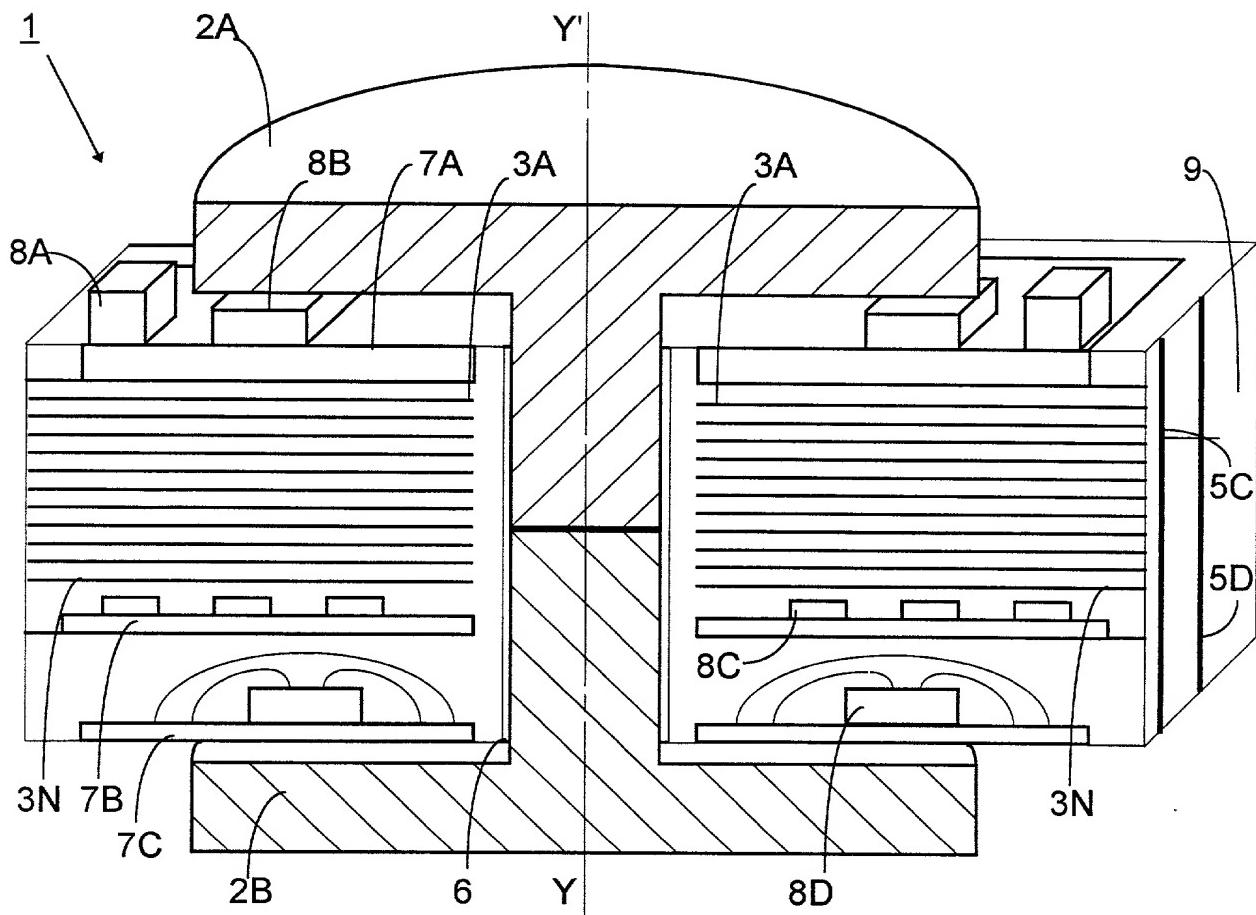
- DRAFT - 10092010
5. An electronic module incorporating a core and taking the form of a block which includes at least one winding made up of conductive tracks on a printed circuit film support adapted to form turns, in a particular arrangement, and wherein at least some turns are combined to form a winding, which module includes a stack of modular printed circuit film elements aligned at one edge at least and each carrying one or more turns which are to form part of a winding or a plurality of parallel and/or coaxial windings and whose tracks terminate at a face defined by aligned edges of stacked modular elements on which are formed conductive connecting tracks for connecting the turns to each other and to connection elements of external connection means, and at least some of the adjacent modules in said stack include identical openings at the center of at least one turn relating to a particular winding to form a passage for a core housed in a conduit formed by successive modules incorporating such openings.
  6. The module claimed in claim 4, for example a converter module, wherein at least one supplementary modular printed circuit element carrying components is embedded in the molded block at one end at least of the stack of elements forming a winding or windings and each supplementary element includes conductive tracks terminating at and electrically connected to conductive tracks formed on a particular face of said block by aligned edges of stacked modular elements.
  7. The module claimed in claim 5, for example a converter module, wherein at least one supplementary modular printed circuit element carrying components is embedded in the molded block at one end at least of the stack of elements forming a winding or windings and each supplementary element includes conductive tracks terminating at and electrically connected to conductive tracks formed on a particular face of said block by aligned edges of stacked modular elements.

## ABSTRACT OF THE DISCLOSURE

A method of obtaining a module including at least one inductive winding made up of one or more conductive tracks on a printed circuit film support on which the tracks form turns which are combined to form a winding or a plurality of parallel and/or coaxial windings includes the following steps:

- stacking a plurality of aligned modular printed circuit film elements carrying a set of turns which are intended to form part of a winding or of a plurality of parallel and/or coaxial windings and whose tracks terminate at or near the edge or one edge of the element that includes them,
  - 10            - molding an insulative material over the stacked assembly of modular elements to constitute a rigid block,
  - cutting the molded block laterally along the stack to expose the conductive tracks at a common alignment level and so that they are flush with the surface of one face of the block, which cutting step is performed at least once, and
  - 15            - creating connections on the face or faces of the block with which the modular conductive track elements are flush to interconnect them selectively and to connect them to connection means external to the module.

## FIGURE UNIQUE



## French Language Declaration

### Declaration and Power of Attorney for Patent Application

### Déclaration et Pouvoirs pour Demande de Brevet

#### French Language Declaration

En tant que l'inventeur nommé ci-après, je déclare par le présent acte que:

Mon domicile, mon adresse postale et ma nationalité sont ceux figurant ci-dessous à côté de mon nom.

Je crois être le premier inventeur original et unique (si un seul nom est mentionné ci-dessous), ou l'un des premiers co-inventeurs originaux (si plusieurs noms sont mentionnés ci-dessous) de l'objet revendiqué, pour lequel une demande de brevet a été déposée concernant l'invention de la description identifiée par le numéro de référence

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention in the specification identified by Docket No.

**102210/BM/SPD**

Je déclare par le présent acte avoir passé en revue et compris le contenu de la description ci-dessus, revendications comprises.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims.

Je reconnais devoir divulguer toute information pertinente à la brevetabilité, comme défini dans le Titre 37, § 1.56 du Code fédéral des réglementations.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

Je revendique par le présent acte avoir la priorité étrangère, en vertu du Titre 35, § 119(a)-(d) ou § 365(b) du Code des Etats-Unis, sur toute demande étrangère de brevet ou certificat d'inventeur ou, en vertu du Titre 35, § 365(a) du même Code, sur toute demande internationale PCT désignant au moins un pays autre que les Etats-Unis et figurant ci-dessous et, j'ai aussi indiqué ci-dessous toute demande étrangère de brevet, tout certificat d'inventeur ou toute demande internationale PCT ayant une date de dépôt précédant celle de la demande à propos de laquelle une priorité est revendiquée

I hereby claim foreign priority under Title 35, United States Code, § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below, and have also identified below any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior foreign application(s) for which priority is claimed

Demande(s) de brevet étrangère(s) antérieure(s) dont la priorité est revendiquée

(Number) (Numéro)	(Country) (Pays)	(Day/Month/Year Filed) (Jour/Mois/Année de dépôt)
99 09 860	FRANCE	29 JULY 1999

Prior foreign applications for which priority is not claimed

Demande(s) de brevet étrangères antérieure(s) dont la priorité n'est pas revendiquée

(Number) (Numéro)	(Country) (Pays)	(Day/Month/Year Filed) (Jour/Mois/Année de dépôt)

## French Language Declaration

Je revendique par le présent acte tout bénéfice, en vertu du Titre 35, § 119(e) du Code des Etats-Unis, de toute demande de brevet provisoire effectuée aux Etats-Unis et figurant ci-dessous.

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.

(Application No.)  
(No de demande)

(Filing Date)  
(Date de dépôt)

Je revendique par le présent acte tout bénéfice, en vertu du Titre 35, § 120 du Code des Etats-Unis, de toute demande de brevet effectuée aux Etats-Unis, ou en vertu du Titre 35, § 365(c) du même Code, de toute demande internationale PCT désignant les Etats-Unis et figurant ci-dessous et, dans la mesure où l'objet de chacune des revendications de cette demande de brevet n'est pas divulgué dans la demande antérieure américaine ou internationale PCT, en vertu des dispositions du premier paragraphe du Titre 35, § 112 du Code des Etats-Unis, je reconnais devoir divulguer toute information pertinente à la brevetabilité, comme défini dans le Titre 37, § 1.56 du Code fédéral des réglementations, dont j'ai pu disposer entre la date de dépôt de la demande antérieure et la date de dépôt de la demande nationale ou internationale PCT de la présente demande.

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

(Application No.)  
(N° de demande)

(Filing Date)  
(Date de dépôt)

(Status)(patented, pending, abandoned)  
(Statut)(breveté, en cours d'examen, abandonné)

Je déclare par le présent acte que toute déclaration ci-incluse est, à ma connaissance, véridique et que toute déclaration formulée à partir de renseignements ou de suppositions est tenue pour véridique; et de plus, que toutes ces déclarations ont été formulées en sachant que toute fausse déclaration volontaire ou son équivalent est passible d'une amende ou d'une incarcération, ou des deux, en vertu de la Section 1001 du Titre 18 du Code des Etats-Unis, et que de telles déclarations volontairement fausses risquent de compromettre la validité de la demande de brevet ou du brevet délivré à partir de celle-ci.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

## French Language Declaration

**POUVOIRS:** En tant que l'inventeur cité, je désigne par la présente l'(les) avocat(s) et/ou agent(s) suivant(s) pour qu'ils poursuive(nt) la procédure de cette demande de brevet et traite(nt) toute affaire s'y rapportant avec l'Office des brevets et des marques: (mentionner le nom et le numéro d'enregistrement).

John H. Mion, Reg. No. 18,879; Thomas J. Macpeak, Reg. No. 19,292; Robert J. Seas, Jr., Reg. No. 21,092; Darryl Mexic, Reg. No. 23,063; Robert V. Sloan, Reg. No. 22,775; Peter D. Olexy, Reg. No. 24,513; J. Frank Osha, Reg. No. 24,625; Waddell A. Biggart, Reg. No. 24,861; Louis Gubinsky, Reg. No. 24,835; Neil B. Siegel, Reg. No. 25,200; David J. Cushing, Reg. No. 28,703; John R. Inge, Reg. No. 26,916; Joseph J. Ruch, Jr., Reg. No. 26,577; Sheldon I. Landsman, Reg. No. 25,430; Richard C. Turner, Reg. No. 29,710; Howard L. Bernstein, Reg. No. 25,665; Alan J. Kasper, Reg. No. 25,426; Kenneth J. Burchfiel, Reg. No. 31,333; Gordon Kit, Reg. No. 30,764; Susan J. Mack, Reg. No. 30,951; Frank L. Bernstein, Reg. No. 31,484; Mark Boland, Reg. No. 32,197; William H. Mandir, Reg. No. 32,156; Scott M. Daniels, Reg. No. 32,562; Brian W. Hannon, Reg. No. 32,778; Abraham J. Rosner, Reg. No. 33,276; Bruce E. Kramer, Reg. No. 33,725; Paul F. Neils, Reg. No. 33,102; and Brett S. Sylvester, Reg. No. 32,765; and Robert M. Masters, Reg. No. 35,603.

**POWER OF ATTORNEY:** As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: (list name and registration number)

Adresser toute correspondance à:

Send Correspondence to:  
SUGHRUE, MION, ZINN, MACPEAK & SEAS, PLLC  
2100 Pennsylvania Avenue, N.W., Suite 800  
Washington, D.C. 20037-3213

Nom complet de l'unique ou premier inventeur	Full name of sole or first inventor (First Middle Last) Norbert VENET	
Signature de l'inventeur	Date	Inventor's signature <i>Norbert Venet</i>
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Nationalité	Citizenship French	
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Nom complet du second co-inventeur, le cas échéant	Full name of second joint inventor, if any (First Middle Last) Claude DREVON	
Signature du second inventeur	Date	Second inventor's signature <i>Claude Drevon</i>
Domicile	Residence 31500 TOULOUSE, FRANCE	
Nationalité	Citizenship French	
Adresse postale	Post Office Address 47, rue Sainte Marie 31500 TOULOUSE, FRANCE	

(Fournir les mêmes renseignements et la signature de tout co-inventeur supplémentaire.)

(Supply similar information and signature for third and subsequent joint inventors.)

## French Language Declaration

Nom complet du troisième co-inventeur, le cas échéant		Full name of third joint inventor, if any (First Middle Last) Stéphane ALBINET	
Signature du troisième l'inventeur	Date	Third inventor's signature 	Date 3/07/2024
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Nationalité	Citizenship French		
Adresse postale	Post Office Address Résidence Les Pins 35, rue des soeurs Monié 31830 PLAISANCE DU TOUCH, FRANCE		
Nom complet du quatrième co-inventeur, le cas échéant		Full name of fourth joint inventor, if any (First Middle Last)	
Signature du quatrième l'inventeur	Date	Fourth inventor's signature	Date
Domicile	Residence		
Nationalité	Citizenship		
Adresse postale	Post Office Address		
Nom complet du cinquième co-inventeur, le cas échéant		Full name of fifth joint inventor, if any (First Middle Last)	
Signature du cinquième l'inventeur	Date	Fifth inventor's signature	Date
Domicile	Residence		
Nationalité	Citizenship		
Adresse postale	Post Office Address		
Nom complet du sixième co-inventeur, le cas échéant		Full name of sixth joint inventor, if any (First Middle Last)	
Signature du sixième l'inventeur	Date	Sixth inventor's signature	Date
Domicile	Residence		
Nationalité	Citizenship		
Adresse postale	Post Office Address		